

# A taxonomic revision of *Neisosperma* Raf. (Apocynaceae) in Australia, together with a key to Australian genera of Apocynaceae

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## Summary

Forster, Paul I. (1993). A taxonomic revision of *Neisosperma* Raf. (Apocynaceae) in Australia, together with a key to Australian genera of Apocynaceae. *Austrobaileya* 4(1): 13–20. Two species of *Neisosperma* Raf. are recognised in Australia, namely *N. kilneri* (F. Muell.) Fosberg & Sachet and *N. poweri* (F.M. Bailey) Fosberg & Sachet. *N. kilneri* is lectotypified. Both species are described and illustrated. A key for their identification and notes on their distribution, habitats and conservation status are provided. *N. kilneri* is endangered whereas *N. poweri* is vulnerable. Both species are present in conservation reserves.

A key to the 19 native and naturalised genera of Apocynaceae in Australia is given.

Keywords: *Neisosperma* – Australia, *Neisosperma kilneri*, *Neisosperma poweri*, Apocynaceae – key to genera.

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## Introduction

The genus *Neisosperma* was described by Rafinesque (1838) to include a single species *N. muricata* Raf. from Polynesia. Since then the name *Neisosperma* has been little used and many of the species now referred to the genus were previously included in other genera such as *Ochrosia* Juss. or *Calpicarpum* G. Don. (Fosberg *et al.* 1977).

*Neisosperma* was resurrected by Fosberg and Sachet (1974) who considered that it differed from *Ochrosia* primarily in the loosely fibrous or spinose endocarps of the fruits as opposed to the solid endocarps of the latter. An independent study by Boiteau *et al.* (1974, 1975) came to the same conclusion; however, they applied the later generic name of *Calpicarpum* to this taxon. Subsequently, Fosberg and Sachet (1977) discussed the status of *Neisosperma* and *Calpicarpum* and concluded that the latter was a synonym of the former. Fosberg *et al.* (1977) then made the necessary new combinations under *Neisosperma*, including the transfer of the Australian *Ochrosia poweri* F.M. Bailey and *O. kilneri* F. Muell. Markgraf (1979), in dealing with the Malesian species, summarised

previous work and concluded that the two genera could be distinguished by *Neisosperma* having “Carpels immersed into a special tissue, or in a cross with 2 minute disk scales, abruptly rounded below the style ... Endocarp splitted [sic] into coarse fibers penetrating the mesocarp, often ending in warts in touch with the exocarp. Alkaloids [sic] on corynane basis.” and *Ochrosia* having “Carpels not immersed in a tissue, though glandular at the base, gradually tapering into the the style; no disk ... Mericarps with a solid thin or thick endocarp surrounding two lateral spongy cavities. Alkaloids [sic] on ellipticine basis.” In spite of these differences and the widespread agreement between Boiteau, Fosberg and Markgraf on the necessity for two genera, Leeuwenberg (1987) dismissed their arguments and reunited the two genera when dealing with the African species.

Despite the close attention to the generic status of these plants by Fosberg and his associates, there has still been no monographic revision of the genera *Ochrosia* or *Neisosperma* that provides descriptions and details on distribution and habitats for all species concerned. Recent taxonomic accounts for Africa (Leeuwenberg 1987), Malesia (Markgraf 1979) and New Caledonia (Boiteau 1981) have been

published but the last for Australia was by Bailey in 1900.

Bailey's (1900) account is now outdated and includes detailed accounts of several 'taxa', namely *O. newelliana* F.M. Bailey and *O. mcdowalliana* F.M. Bailey, now considered conspecific with *N. poweri* (F.M. Bailey) Fosberg & Sachet and *N. kilneri* (F. Muell.) Fosberg & Sachet respectively (Fosberg *et al.* 1977). Recent collecting has revealed a much greater range for *N. poweri* in Queensland than that given by, for example, Francis (1981), while *N. kilneri* remains a plant of restricted distribution. I take the opportunity here to describe the Australian species of *Neisosperma* in detail and provide a key for their identification because they are poorly known and have often been confused with each other and with species of *Ochrosia*, either in horticulture or in herbaria. A key to the Australian species of *Ochrosia* has been published previously (Forster 1991); however, I also include a combined key to the three species of *Ochrosia* and the two *Neisosperma* species occurring in Australia, based on vegetative characters, to enable field identification of relevant material. Flowers of the Australian species of *Neisosperma* may be distinguished from those of *Ochrosia* by the presence of a small floral disk of 2 scales alternating with the carpels in the former as opposed to a complete absence of a disk in the latter.

It is anticipated that this is my final revisionary paper on the Australian Apocynaceae, which leaves *Parsonsia* to be reviewed by J.B. Williams. Therefore, a tentative key to the genera of the family considered to occur in Australia (Forster 1991, 1992a,b,c,d,e,f,g, 1993; Forster & Hyland 1991) is presented here. In providing this I invite users to test its validity prior to publication of the account of

Apocynaceae in Volume 28 of 'Flora of Australia'.

### Materials and methods

This revision of Australian *Neisosperma* is based on herbarium materials in AD, BO, BRI, CANB, CBG, MEL, QRS and SING. Both species were examined in the field.

Terminology follows my previous revisionary papers on Australian Apocynaceae (Forster 1992a,b,c,d,e,f,g, 1993).

### Taxonomic treatment

**Neisosperma** Raf., Sylva Tell. 162 (1838). **Type:** *N. muricata* Raf. (= *Neisosperma oppositifolia* (Lam.) Fosberg & Sachet).

Perennial shrubs or trees, evergreen; latex clear or white. Stems without spines. Leaves petiolate, opposite or 3–6 in whorls; lamina simple, coriaceous, with margins entire; colleters absent. Inflorescences axillary, cymose, pedunculate, bracteate. Flowers pedicellate, scented. Calyx lacking colleters. Corolla cream to orange, hypocrateriform; tube cylindrical, contracted at top above stamens, glabrous, without scales; lobes dextrorse in bud; corolline corona absent. Stamens included, inserted near middle or near top of tube; anthers lanceolate. Disk reduced to 2 scales alternate with carpels. Style-head ellipsoid, with a basal ring of hairs, bifid. Fruit apocarpous, mericarps 2, drupaceous; exocarp chartaceous; mesocarp fleshy; endocarp fibrous, projecting into mesocarp numerous hornlike distally directed processes. Seeds 1–4, oblong, flat, ecomose.

A genus of eighteen species, mainly in the Pacific and Indian Oceans, with two species in Australia.

### Key to Australian species of *Neisosperma*

1. Secondary venation in leaf lamina prominent; inflorescence a much branched panicle 5–17 cm long ..... **1. *N. kilneri***
- Secondary venation in leaf lamina  $\pm$  visible; inflorescence an umbelliform cyme 2–4 cm long ..... **2. *N. poweri***

**Key to Australian species of *Ochrosia* and *Neisosperma*  
based on vegetative features and habitat**

1. Leaves always opposite, never in whorls of 4 (Qld/NSW border ranges in rainforest) . . . . . **O. moorei**  
Leaves rarely opposite, usually in whorls of 2 to 4 . . . . . 2
2. Leaf lamina with 20–25 secondary veins per side of midrib . . . . . 3  
Leaf lamina with 25–30 secondary veins per side of midrib . . . . . 4
3. Leaves in whorls of 2 or 3 (Cape York Peninsula in vinethickets) . . . . . **O. minima**  
Leaves in whorls of 4 (central and northern Qld in mangroves) . . . . . **O. elliptica**
4. Secondary veins prominent in lower leaf lamina surface . . . . . **N. kilneri**  
Secondary veins just visible in lower leaf lamina surface . . . . . **N. poweri**

1. *Neisosperma kilneri* (F. Muell.) Fosberg & Sacht, *Adansonia* Ser. 2, 17: 29 (1977); *Ochrosia kilneri* F. Muell., *Fragm.* 7: 129–130 (1871); *Lactaria kilneri* (F. Muell.) Kuntze, *Rev. Gen. Pl.* 415 (1891). **Type:** Queensland. NORTH KENNEDY DISTRICT: Mt Dryander, April 1871, *E. Fitzalan* (lecto (here designated): MEL! [MEL1587728]).

*Ochrosia mcdowalliana* F.M. Bailey, *Bot. Bull.* 7: 65 (1893). **Type:** Queensland. MORETON DISTRICT: cultivated tree, Wickham Terrace Reserve, Brisbane, R. *McDowall* (holo: BRI!; iso: BRI!).

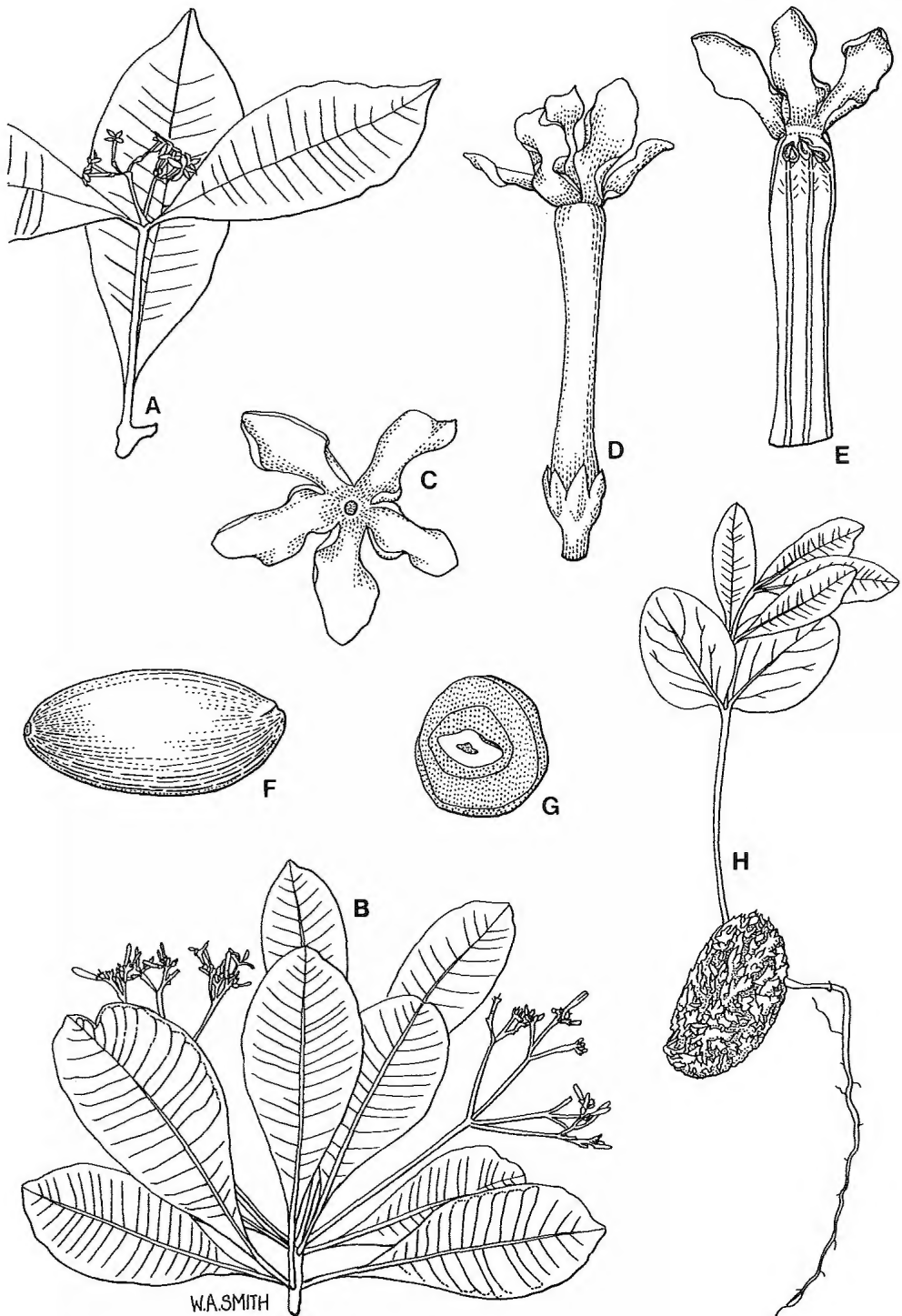
Illustrations: F.M. Bailey, *Queensl. fl.* 3: t. XLI & XLII: 6 (1900); K.A.W. Williams, *Native Pl. Queensl.* 2: 209 (1984).

Tree to 20 m high; latex white. Leaves petiolate, in whorls of 3 or 4; lamina elliptic to obovate, up 14 cm long and 6.5 cm wide, discolorous, glabrous, with secondary veins 25–30 very prominent below, tertiary venation reticulate; upper surface dark green; lower surface golden-brown; tip rounded to retuse; base cuneate; petiole 3–6 mm long. Inflorescences much-branched paniculate, to 17 cm long, paired or in threes at nodes of upper leaf bearing stems; peduncles 10–35 mm long. Flowers c. 7 mm long and 7 mm diameter, strongly scented; pedicels 1–1.3 mm long. Sepals triangular-

ovate, 1–1.5 mm long, 0.9–1 mm wide. Corolla cream; tube 4–5.4 mm long, 1–1.5 mm diameter; lobes obovate, 4–5 mm long, 1.4–1.8 mm wide. Stamens inserted 1.5–1.6 mm from top of tube; anthers 1–1.1 mm long, c. 0.4 mm wide. Fruit ellipsoidal, 45–55 mm long, 25–35 mm wide; exocarp red, endocarp fibrous. **Fig. 1.**

**Selected specimens:** Queensland. NORTH KENNEDY DISTRICT: Dryander Creek, Mt Dryander SE base, 20°14'S, 148°34'E, Jan 1992, *Forster* 9413 (BRI, K, L, MEL, QRS); SE foothills of Mt Dryander, 20°15'S, 148°33'E, May 1969, *Smith* 14528 (BRI, CANB); 2–4 km S of Mt Dryander, N of Proserpine, 20°15'S, 148°33'E, Apr 1985, *Rodd & Hardie* 4445 (BRI); Gregory Creek, 2 km NE of Gregory & c. 15 km N of Proserpine, 20°16'S, 148°35'E, Nov 1985, *Sharpe* 4151 & *Perry* (BRI). SOUTH KENNEDY DISTRICT: Mt Blackwood, creek E of Kuttabul, 21°02'S, 148°56'E, Jul 1991, *Champion* 533 (BRI); Range W of Koumala, May 1927, *Francis* [AQ212765] (BRI). **Cultivated.** Wickham Park, Brisbane City, Feb 1989, *Gordon* [AQ454851] (BRI); Ipswich, Jan 1980, *Bird* [AQ331656] (BRI).

**Distribution and habitat:** *N. kilneri* is known from North and South Kennedy districts of Queensland (**Map 2**) at the type locality Mt Dryander north of Proserpine and at Mt Blackwood. I have been unable to confirm the Francis locality near Koumala; however, the area is poorly known and further survey work in the region centred on Mackay and Proserpine may well reveal additional populations. Plants grow on stony alluvium along creeks in notophyll vineforest at Mt Dryander in association with *N. poweri*.



**Fig. 1.** A, C–G *Neisosperma poweri*. B, H. *N. kilneri*. A, B. habit of flowering stem  $\times 0.4$ . C. face view of flower  $\times 4$ . D. side view of flower  $\times 4$ . E. half corolla showing position of stamens and staminal traces in tube  $\times 4$ . F. side view of fruit  $\times 2$ . G. transverse section of fruit showing different layers  $\times 2$ . H. seedling and fibrous endocarp of fruit  $\times 0.4$ . A, Williams [AQ394694]; B, Bird [AQ331655]; C–G, Forster 8151; H, Forster 5182A. Del. W. Smith.

**Notes:** *N. kilneri* is a distinctive species with its large fruit with the characteristic woody and intricately patterned fibrous endocarp. It is also the only Australian species of the two genera here discussed, with the inflorescence well developed and extending well beyond the foliage.

Despite the earlier attention to nomenclature of the genus by Fosberg and Sachet (1977) and Fosberg *et al.* (1977), no lectotype has previously been selected for *N. kilneri*. There are at least five undated specimens of fruits of this species at MEL as well as a pressed specimen with flowers that is dated April 1871, all collected by Fitzalan at Mt Dryander. The flowering specimen is selected as lectotype of the name *Ochrosiakilneri* F. Muell. as it is dated and predates the publication of that name by Mueller (1871) and is a more complete collection than the others.

**Phenology:** Flowers April to May; fruits May to July.

**Conservation status:** Since this species is known definitely from only two localities, this plant should be considered as endangered with a coding of 3EC (cf. Briggs & Leigh 1988). Even though part of the Mt Dryander population is now included within a National Park, there are large numbers of plants in Dryander Creek on the south-east side of the mountain that are not. Plants are infrequently cultivated.

2. *Neisosperma poweri* (F.M. Bailey) Fosberg & Sachet, *Adansonia* Ser. 2, 17: 31 (1977); *Ochrosia poweri* F.M. Bailey, *Bot. Bull.* 13: 11 (1896). **Type:** Queensland. MORETON DISTRICT: Eumundi, November 1895, *F.M. Bailey* (holo: BRI!).

*Ochrosia newelliana* F.M. Bailey, *Queensland Agric. J.* 5: 389 (1899). **Type:** Queensland. COOK DISTRICT: Atherton, *J.F. Bailey* (holo: BRI!).

Illustration: F.M. Bailey, *Queensl. fl.* 3: t. XLI & XLII: 2, 3 (1900); Floyd, *Rainforest Trees Mainland S-E. Austral.* 71 (1989).

Tree to 10 m high; latex white. Leaves petiolate, in whorls of 2 or 3; lamina elliptic, obovate or lanceolate-elliptic, up to 15 cm long and 4.5 cm wide, discolorous, glabrous, with secondary veins 25–30 per side of midrib but  $\pm$  obscure, tertiary venation obscure; upper surface glossy green; lower surface golden-brown; tip acute to shortly acuminate; base cuneate; petiole 3–6 mm long. Inflorescence a solitary umbelliform cyme in the upper leaf bearing axils; peduncle 1–25 mm long. Flowers 9–10 mm long, c. 4 mm diameter; pedicels 1–1.5 mm long. Sepals lanceolate-ovate, 1.3–1.8 mm long, 0.7–0.9 mm wide. Corolla cream to pale yellow; tube 7–10 mm long, 0.7–1 mm diameter; lobes lanceolate-ovate, 2.5–7 mm long, 1.7–2.6 mm wide. Stamens inserted just below top of tube; anthers 1–1.1 mm long, c. 0.5 mm wide. Fruit ellipsoid-obloid, 35–40 mm long, 14–15 mm diameter, exocarp red, endocarp fibrous. **Fig. 1.**

**Selected specimens:** Queensland. COOK DISTRICT: DAVIES CREEK, S.F. 607, 9 km past National Park carpark, 17°02'S, 142°38'E, Jun 1991, *Forster* 8532 (BRI, MEL, QRS); Smithfield, R99, Mar 1961, *Hyland* 1811 (BRI); S.F. 185 Danbulla, Kauri Creek road, 4 km from Tinaroo Dam end, 17°06'S, 145°35'E, Jan 1992, *Forster* 9546 (BRI, K, L, MEL, QRS); Tolga, Apr 1962, *McKee* 9293 (BRI); The Crater, Mt Hypipamee N.P., 17°25'S, 145°30'E, Aug 1948, *Smith* 3891 (BRI); East Malanda, Sep 1929, *Kajewski* 1217 (BRI); Goolagan Creek, Palmerston, 17°50'S, 146°05'E, Nov 1963, *Hyland* 3073 (BRI). NORTH KENNEDY DISTRICT: Herberton Range, Nov 1929, *Kajewski* 1374 (BRI); Portion 69, Parish Herberton, 17°28'S, 145°28'E, Jan 1977, *Gray* 216 (BRI, QRS); Keough's Block, Evelyn, Mar 1972, *Stocker* 860 (BRI, QRS); SE base of Mt Dryander, middle branch of Dryander Creek, 20°16'S, 148°35'E, Jun 1989, *Forster* 5180 & *Tucker* (BRI, NSW); Impulse Creek, S.F. Conway, 20°21'S, 148°44'E, May 1991, *Forster* 8286 & *McDonald* (BRI, MEL, QRS); Mt Macartney, S.F. 652 Cawley, 20°49'S, 148°33'E, Apr 1991, *Forster* 8151 & *McDonald* (BISH, BRI, CBG, K, L, MEL, MO, QRS). WIDE BAY DISTRICT: Mt Cooroy, c. 4 km E of Cooroy, 26°26'S, 152°57'E, Nov 1988, *Sharpe* 4829 *et al.* (BRI). MORETON DISTRICT: Tuckers Creek N.P., 2 km N of Nambour, 26°36'S, 152°38'E, Jan 1990, *Sharpe* 4935 & *Thomas* (BRI); Brolga Park, Dulong road, Dulong, 26°39'S, 152°54'E, Dec 1989, *Sharpe* 4929 & *Bean* (BRI); Upper Tallebudgera, Dec 1917, *White* [AQ212761] (BRI); Cougals track, Jun 1984, *Jones* [AQ440569] (BRI). New South Wales. Bangalow, Dec 1896, *Baker* [AQ212763] (BRI).

**Distribution and habitat:** *N. poweri* has been recorded from north-eastern New South Wales mainly late last century (Floyd 1989), and its distribution is highly disjunct in eastern Queensland with populations in south-eastern, central

and north-eastern regions (**Map 1**). A northern limit appears to be in the Lamb Range, north of Mareeba (cf. *Forster* 8532). Plants grow in notophyll vineforests on volcanic soils, often, but not exclusively so, on alluvia.

*Notes:* *N. poweri* has been confused in herbaria and cultivation with *N. kilneri* and *Ochrosia minima* (Markgraf) Fosberg & Boiteau (Forster 1991).

This species has alkaloids in the foliage and bark (Doy & Moore 1962, Douglas *et al.* 1964) and the fruit are poisonous to mammals.

*Phenology:* Flowers and fruits throughout the year.

*Conservation status:* This species is widespread but populations are highly disjunct. An appropriate conservation coding is 3VC (cf. Briggs & Leigh 1988). It is present in several National Parks in both southern (Forster *et al.* 1991) and north-eastern Queensland.

### Key to the native and naturalised genera of Apocynaceae in Australia

1. Stems with spines . . . . . **Carissa**  
Stems without spines . . . . . 2
2. Stems twining . . . . . 3  
Stems erect or sprawling, not twining . . . . . 6
3. Stamens exerted from corolla tube; anthers adherent to style-head . . . . . **Parsonsia**  
Stamens included in corolla tube; anthers free of style-head . . . . . 4
4. Fruit a dehiscent dry follicle; seeds comose . . . . . **Ichnocarpus**  
Fruit an indehiscent fleshy drupe; seeds ecomose . . . . . 5
5. Corolline corona present; fruit not stipitate and not comprised of  
several articles . . . . . **Melodinus**  
Corolline corona absent; fruit stipitate and comprised of 1–3 articles . . . . . **Alyxia**
6. Fruit dehiscent . . . . . 7  
Fruit indehiscent . . . . . 11
7. Corolla with corolline corona of lobing at tube mouth . . . . . 8  
Corolla without corolline corona of lobing at tube mouth . . . . . 9
8. Corolla lobes dextrorse in bud . . . . . **Nerium**  
Corolla lobes sinistrorse in bud . . . . . **Wrightia**
9. Anthers adherent to style-head; fruit with long soft spines . . . . . **Allamanda**  
Anthers free of style-head; fruit without long soft spines . . . . . 10
10. Fruit woody, fusiform . . . . . **Alstonia**  
Fruit fleshy, obliquely ovoid . . . . . **Tabernaemontana**
11. Herbs . . . . . 12  
Shrubs or trees . . . . . 13

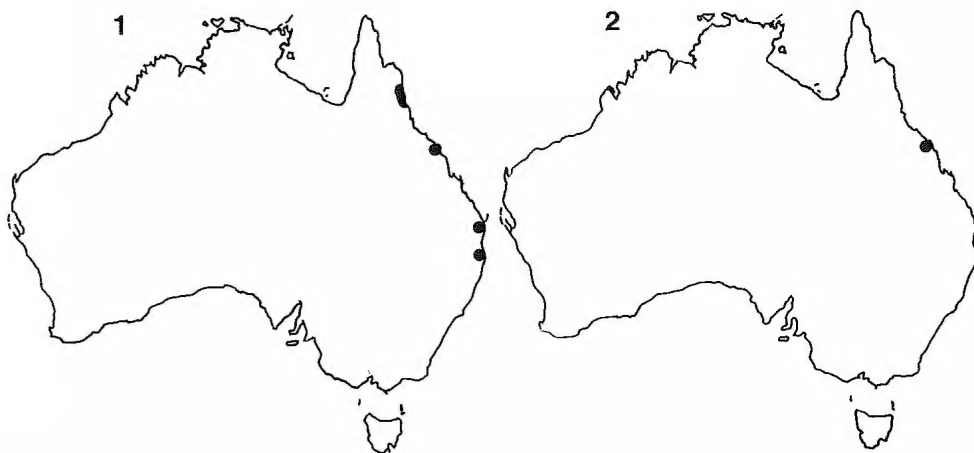
12. Stems stoloniferous; corolla lilac-blue ..... **Vinca**  
 Stems not stoloniferous; corolla white or pink ..... **Catharanthus**
13. Leaf lamina base with colleters ..... **Rauvolfia**  
 Leaf lamina base without colleters ..... 14
14. Corolla infundibuliform ..... **Cascabela**  
 Corolla hypocrateriform or salverform ..... 15
15. Style with disk at base ..... 16  
 Style without disk at base ..... 18
16. Corolla lobes sinistrorse in bud ..... **Voacanga**  
 Corolla lobes dextrorse in bud ..... 17
17. Corolla tube contracted at top above stamens; fruit endocarp fibrous ..... **Neisosperma**  
 Corolla tube expanded at top above stamens; fruit endocarp fleshy ..... **Kopsia**
18. Corolla lobes dextrorse in bud ..... **Ochrosia**  
 Corolla lobes sinistrorse in bud ..... 19
19. Anthers with introrse dehiscence; fruit moniliform, often with 1–several  
 articles ..... **Alyxia**  
 Anthers with lateral to sublateral dehiscence; fruit winged. .... **Cerbera**

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Maps 1–2. Distribution of *Neisosperma* spp. mapped in 1° grid squares. 1. *N. poweri*. 2. *N. kilneri*.

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